

C++ Programming Lab.

Sheet #1 Solution

“Basics of C++”

Prep. Year, FoEE

Variables

A variable is some space reserved in memory with a name to use it.

Declaration (Definition): `data_type variable_name;`

* **Data types:**

char

(characters)

int - long

(integrals)

float - double

(real numbers)

Variable Declaration (Cont'd)

Variable Naming constraints:

- 1- does NOT begin with a number or special character. Underscore “_” is allowed, but dash “-” is forbidden.
- 2- has NO spaces or special characters (except “_”).
- 3- is NOT a reserved word, e.g. include, const, int...

Naming styles include **camel** (first small then each word starts with a capital; e.g. backColor) and **Pascal** (Capitalize Each Word ; e.g. BackColor)

(Don't Forget C++ is **CASE SENSITIVE**): identical identifiers for a single variable in the program.

Hints

You can declare more than one variable of the same data type in the same line:

For example:

```
float y, z;
```

You can as well initialize the variable to a value:

For example:

```
int o = 10;
```

If more than one variable, each is initialized alone;

For example:

```
int number1 = 10, number2 = 9;
```

To declare a constant number that is never changed after declaration type

`const`

For Example:

```
const float pi = 3.14;
```

Multiple Choice Questions (MCQs)

1- Which of the following are valid C++ identifiers?

- (a) Const
- (b) y=z
- (c) xyz123
- (d) Bill
- (e) ThisIsALongOne
- (f) Sue's
- (g) two-way
- (h) int
- (i) so is this one
- (j) amount
- (k) 2ndclass

MCQ #1 Solution

Valid:

(a) Const

(c) xyz123

(d) Bill

(e) ThisIsALongOne

(j) amount

MCQ #1 Solution (Cont'd)

Invalid:

(b) $y=z$ → contains “=” (special char): not allowed

(f) Sue's → contains “ ’ ” (special char)

(g) two-way → contains “-” (special char)

(h) int → reserved word

(i) so is this one → contains spaces

(k) 2ndclass → starts with a number

MCQ #2

2. Values can be input to variables in the program using the stream

(a) cin

(b) cout

MCQ #2 Solution

2. Values can be input to variables in the program using the stream

(a) cin

MCQ #3

3. Comments in C++ are started with

(a) #

(b) //

(c) \$

(d) ;

MCQ #3 Solution

3. Comments in C++ are started with

(b) //

Comments

Used to make a reminder for the programmer of some notes in the code to make it more easy to understand

- * The compiler doesn't compile comments.
- * Start the comment line with `//` if in only one line.
- * Or if the comment is in more that one line

`/*`

Your comments

`*/`

Review Questions (RQs)

1. Write a constant declaration that declares constants to hold the number of days in a week and the number of weeks in a year. In a separate constant statement declare a constant pi as 3.1415927.

```
const int  days_in_week = 7, weeks_in_year = 52;  
const float pi = 3.1415927;
```

2. Write declaration statements to declare integer variables i and j and float variables x and y. Extend your declaration statements so that i and j are both initialized to 1 and y is initialised to 10.0.

```
int i, j;  
float x,y;
```

After extension, the answer will be:

```
int i=1, j=1;  
float x , y=10.0;
```

RQs (Cont'd)

3. Write C++ instructions to ask a user to type in three numbers and to read them into integer variables first, second and third.

```
cout<<"please enter three numbers";  
cin>>first>>second>>third;
```

4. Write C++ instructions to output the value of a variable x in a line as follows:

The value of x is

```
cout<<"The value of x is"<<x ;
```

5. Write C++ instructions to generate output as follows:

A circle of radius

has area

and circumference

where the values of the radius, the area and the circumference are held in variables rad, area, and circum.

```
cout<<"A circle of radius "<< rad<<endl;  
cout<< "has area "<<area<<endl;  
cout<<"and circumference "<<circum ;
```

RQ #6

6. Correct the syntax errors in the following C++ program:

```
include iostream.h
```

```
Main();
```

```
}
```

```
Float x, y, z;
```

```
cout < "Enter two numbers ";
```

```
cin >> a >> b
```

```
cout << 'The numbers in reverse order are'
```

```
<< b, a;
```

```
{
```

RQ #6 Solution

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
Main();
```

```
}
```

```
Float x, y, z;
```

```
cout < "Enter two numbers ";
```

```
cin >> a >> b
```

```
cout << 'The numbers in reverse order are'
```

```
<< b, a;
```

```
{
```


RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
Float x, y, z;
```

```
cout < "Enter two numbers ";
```

```
cin >> a >> b
```

```
cout << 'The numbers in reverse order are'
```

```
<< b, a;
```

```
{
```

RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
Float x, y, z;
```

```
cout < "Enter two numbers ";
```

```
cin >> a >> b
```

```
cout << 'The numbers in reverse order are'
```

```
<< b, a;
```

```
{
```

RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
float x, y, z;
```

```
cout < "Enter two numbers ";
```

```
cin >> a >> b
```

```
cout << 'The numbers in reverse order are'
```

```
<< b, a;
```

```
{
```

RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

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main()
```

```
{
```

```
float x, y, z;
```

```
cout << "Enter two numbers ";
```

```
cin >> a >> b
```

```
cout << 'The numbers in reverse order are'
```

```
<< b, a;
```

```
{
```

RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
float x, y, z;
```

```
cout << "Enter two numbers ";
```

```
cin >> x >> y;
```

```
cout << 'The numbers in reverse order are'
```

```
<< b, a;
```

```
{
```

RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
float x, y, z;
```

```
cout << "Enter two numbers ";
```

```
cin >> x >> y;
```

```
cout << "The numbers in reverse order are"
```

```
<< b, a;
```

```
{
```

RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
float x, y, z;
```

```
cout << "Enter two numbers ";
```

```
cin >> x >> y;
```

```
cout << "The numbers in reverse order are"
```

```
<< y<<" , "<< x;
```

```
{
```

RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
float x, y, z;
```

```
cout << "Enter two numbers ";
```

```
cin >> x >> y;
```

```
cout << "The numbers in reverse order are" << y << ", " << x;
```

```
{
```


RQ #6 Solution (Cont'd)

6. Correct the syntax errors in the following C++ program:

```
#include <iostream.h>
```

```
main()
```

```
{
```

```
float x, y, z;
```

```
cout << "Enter two numbers ";
```

```
cin >> x >> y;
```

```
cout << "The numbers in reverse order are" << y << ", " << x;
```

```
}
```

RQs (Cont'd)

7. Show the form of output displayed by the following statements when total has the value 352.74.

```
cout << "The final total is: " << endl;
```

```
cout << "$" << total << endl;
```

The final total is:

\$352.74

RQs (Cont'd)

8. What data types would you use to represent the following items?

9. Write suitable declarations for variables in question 8. Be sure to choose correct and meaningful identifiers.

(a) the number of students in a class

(int)

int student_no;

(b) the grade (a letter) attained by a student in the class

(char)

char grade;

(c) the average mark in a class

(float)

float mark_av ;

(d) the distance between two points

(float or double)

float distance;

(e) the population of a city

(long)

long city_population;

(f) the weight of a postage stamp

(float)

float weight;

(g) the registration letter of a car

(char)

char reg_letter;

Exercises

1. Using literal character strings and cout print out a large letter E as below:

XXXXXX

X

X

XXX

X

X

XXXXXX

Exercise #1 Solution

```
#include<iostream.h>
# include<conio.h>
void main()
{
cout<<"XXXXX" << endl;
cout<<"X" << endl;
cout<<"X" << endl;
cout<<"XXX" << endl;
cout<<"X" << endl;
cout<<"X" << endl;
cout<<"XXXXX";
getch();
}
```

Exercise #2

2. Write a program to read in four characters and to print them out, each one on a separate line, enclosed in single quotation marks.

Exercise #2 Solution

```
#include<iostream.h>
#include <conio.h>
void main()
{
char x, y, z, w;
cout << "Please enter four characters to be reprinted out \n";
cin >> x >> y >> z >> w;
cout <<" ' " << x << " ' " << endl;
cout << " ' " << y << " ' " << endl;
cout << " ' " << z << " ' " << endl;
cout << " ' " << w << " ' " << endl;
getch();
}
```

Exercise #3

- 3. Write a program which prompts the user to enter two integer values and a float value and then prints out the three numbers that are entered with a suitable message •

Exercise #3 Solution

```
#include <iostream.h>
#include <conio.h>
void main()
{
    int x, y;
    float z;
    cout<<"Please enter two integer numbers and float number: ";
    cin >> x >> y >> z;
    cout << " The integer numbers are " << x << " , and " << y <<
    endl;
    cout << " The float number is " << z;
    getch();
}
```